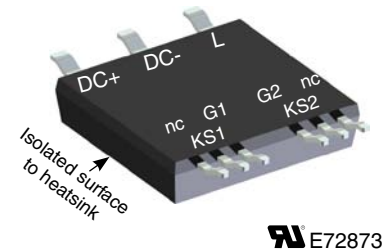
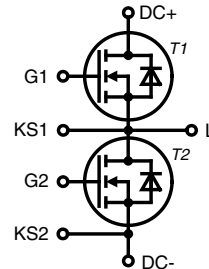


# CoolMOS™ 1) Power MOSFET

## ISOPLUS™ - electrically isolated surface to heatsink

### Surface Mount Power Device

$I_{D25} = 50 \text{ A}$   
 $V_{DSS} = 600 \text{ V}$   
 $R_{DS(on) \text{ max}} = 45 \text{ m}\Omega$



#### MOSFETs T1, T2

Symbol	Conditions	Maximum Ratings	
$V_{DSS}$	$T_{VJ} = 25^\circ\text{C to } 150^\circ\text{C}$	600	V
$V_{GS}$		$\pm 20$	V
$I_{D25}$	$T_C = 25^\circ\text{C}$	50	A
$I_{D80}$	$T_C = 80^\circ\text{C}$	38	A
$E_{AS}$ $E_{AR}$	single pulse repetitive } $I_D = 11 \text{ A}; T_C = 25^\circ\text{C}$	1950	mJ
$dV/dt$	MOSFET $dV/dt$ ruggedness $V_{DS} = 0 \dots 480 \text{ V}$	50	V/ns

#### Symbol Conditions Characteristic Values

( $T_{VJ} = 25^\circ\text{C}$ , unless otherwise specified)

Symbol	Conditions	min.	typ.	max.		
$R_{DS(on)}$	$I_D = 44 \text{ A}; V_{GS} = 10 \text{ V}$		40	45	m $\Omega$	
$V_{GS(th)}$	$I_D = 3 \text{ mA}; V_{DS} = V_{GS}$	2.5	3	3.5	V	
$I_{DSS}$	$V_{DS} = V_{DSS}; V_{GS} = 0 \text{ V};$ $T_{VJ} = 25^\circ\text{C}$ $T_{VJ} = 125^\circ\text{C}$		50	10	$\mu\text{A}$ $\mu\text{A}$	
$I_{GSS}$	$V_{DS} = 0 \text{ V}; V_{GS} = \pm 20 \text{ V}$			100	nA	
$C_{iss}$ $C_{oss}$	} $V_{GS} = 0 \text{ V}; V_{DS} = 100 \text{ V}; f = 1 \text{ MHz}$		6800		pF	
				320		pF
$Q_g$ $Q_{gs}$ $Q_{gd}$	} $V_{DS} = 400 \text{ V}; I_D = 44 \text{ A}$ $V_{GS} = 10 \text{ V}; R_G = 3.3 \Omega$		150	190	nC	
				35		nC
				50		nC
$t_{d(on)}$ $t_r$ $t_{d(off)}$ $t_f$ $E_{on}$ $E_{off}$	} Resistive switching $T_{VJ} = 125^\circ\text{C}$ $V_{DS} = 380 \text{ V}; I_D = 30 \text{ A}$ $V_{GS} = 10 \text{ V}; R_G = 3.3 \Omega$		22		ns	
				10		ns
				120		ns
				12		ns
				70		$\mu\text{J}$
				22		$\mu\text{J}$
$t_{d(on)}$ $t_r$ $t_{d(off)}$ $t_f$ $E_{on}$ $E_{off}$ $E_{rec(off)}$	} Inductive switching $T_{VJ} = 25^\circ\text{C}$ $V_{DS} = 380 \text{ V}; I_D = 30 \text{ A}$ $V_{GS} = 10 \text{ V}; R_G = 330 \Omega$		900		ns	
				400		ns
						ns
				520		ns
				18		mJ
				5.2		mJ
				0.18		mJ
$R_{thJC}$ $R_{thJH}$	with heatsink compound; IXYS test setup			0.4	K/W	
				0.6		K/W

#### Features

- **Fast CoolMOS™ 1)** power MOSFET 4<sup>th</sup> generation
  - high blocking capability
  - lowest resistance
  - avalanche rated for unclamped inductive switching (UIS)
  - low thermal resistance due to reduced chip thickness
- **Package**
  - isolated surface to heatsink
  - low coupling capacity between pins and heatsink
  - PCB space saving
  - enlarged creepage towards heatsink
  - application friendly pinout
  - low inductive current path
  - high reliability

#### Applications

- Switch mode power supplies (SMPS)
- Soft switching topologie
- Resonant converter

<sup>1)</sup> CoolMOS™ is a trademark of Infineon Technologies AG.

**Source-Drain Diodes of T1/T2**

Symbol	Conditions	Maximum Ratings		
$I_{S25}$	$T_C = 25^\circ\text{C}$	50	A	
$I_{S80}$	$T_C = 80^\circ\text{C}$	38	A	

Symbol	Conditions	Characteristic Values			
( $T_{VJ} = 25^\circ\text{C}$ , unless otherwise specified)					
		min.	typ.	max.	
$V_{SD}$	$I_F = 44\text{ A}; V_{GS} = 0\text{ V}$		0.95	1.25	V
$t_{rr}$	$I_F = 44\text{ A}; -di_F/dt = 100\text{ A}/\mu\text{s}; V_R = 400\text{ V}$		600		ns
$Q_{RM}$			17		$\mu\text{C}$
$I_{RM}$			60		A

**Component**

Symbol	Conditions	Maximum Ratings		
$T_{VJ}$		-55...+150	$^\circ\text{C}$	
$T_{stg}$		-55...+125	$^\circ\text{C}$	
$V_{ISOL}$	$I_{ISOL} \leq 1\text{ mA}; 50/60\text{ Hz}$	2500	V~	
$F_C$	mounting force	40 ... 130	N	

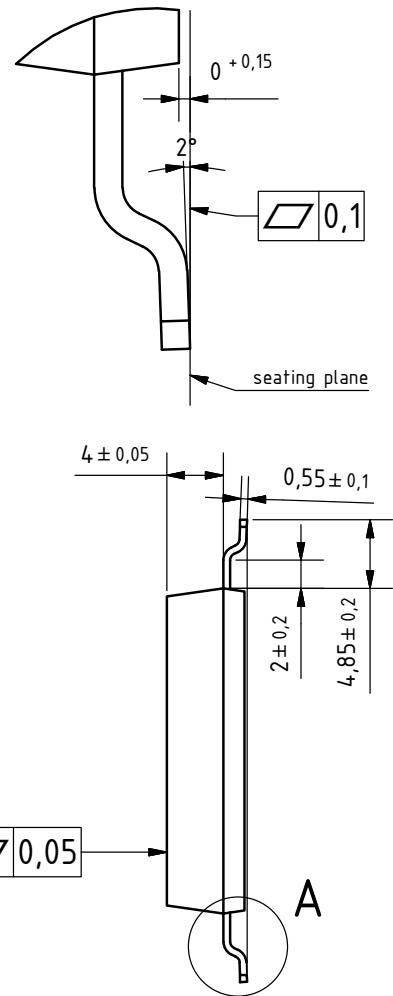
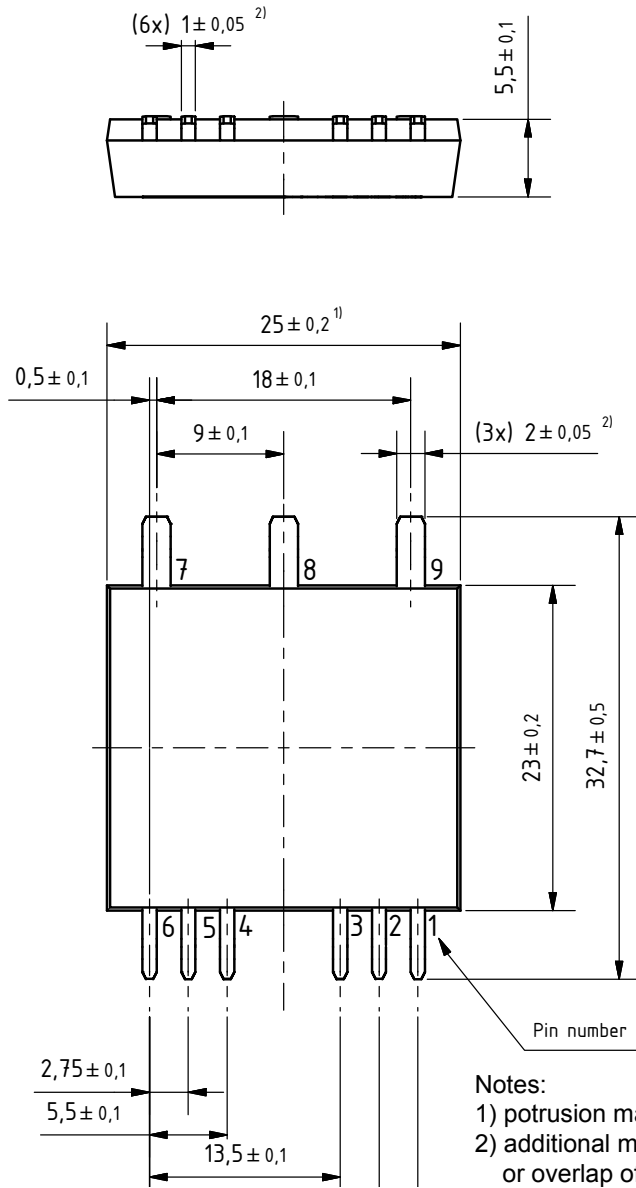
  

Symbol	Conditions	Characteristic Values			
		min.	typ.	max.	
$C_p$	coupling capacity between shorted pins and backside metal		90		pF
$d_S, d_A$	pin - pin	1.65			mm
$d_S, d_A$	pin - backside metal	4			mm
<b>CTI</b>		400			
<b>Weight</b>			8		g

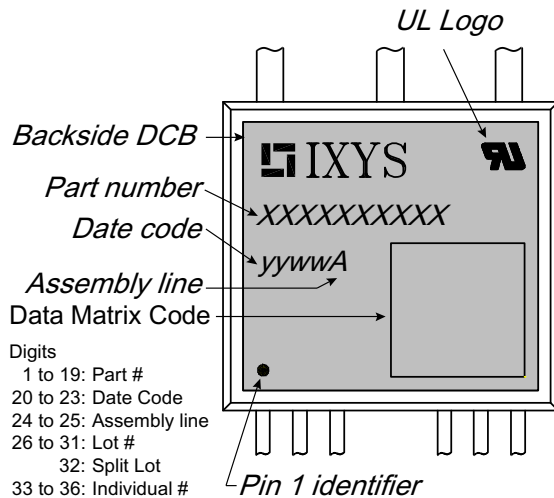
Ordering	Part Name	Marking on Product	Delivering Mode	Base Qty	Ordering Code
Standard	MKE38P600LB-TRR	MKE38P600LB	Tape&Reel	200	510486
	MKE38P600LB	MKE38P600LB	Blister	45	480601

Dimensions in mm  
(1 mm = 0.0394")

A ( 8 : 1 )



Notes:  
 1) potrusion may add 0.2 mm max. on each side  
 2) additional max. 0.05 mm per side by punching misalignment or overlap of dam bar or bending compression



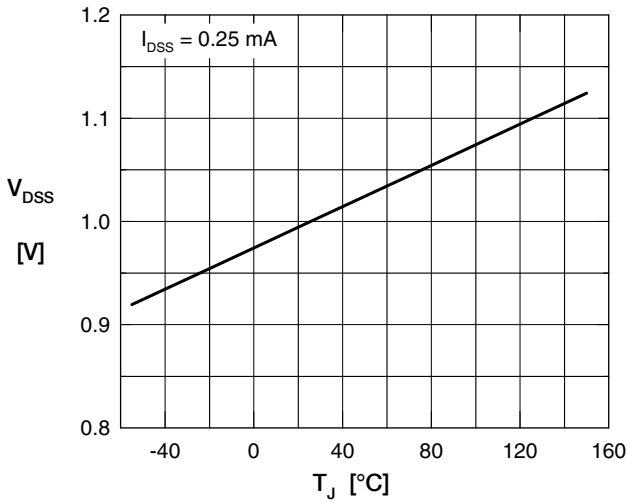


Fig.1 Drain source breakdown voltage versus temperature  $T_{VJ}$

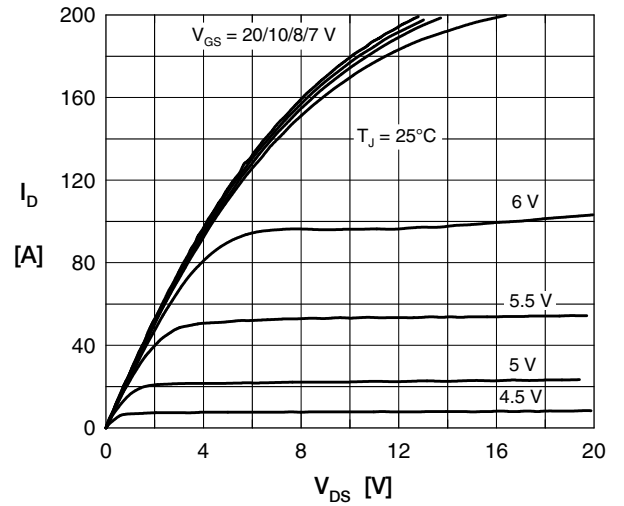


Fig. 2 Typ. output characteristics

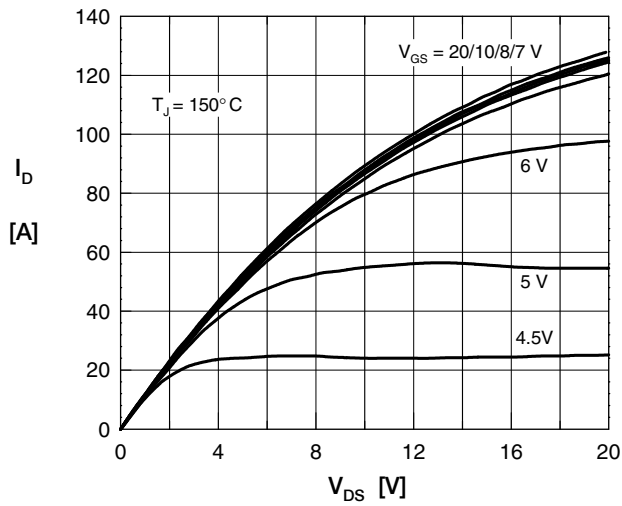


Fig. 3 Typ. output characteristics

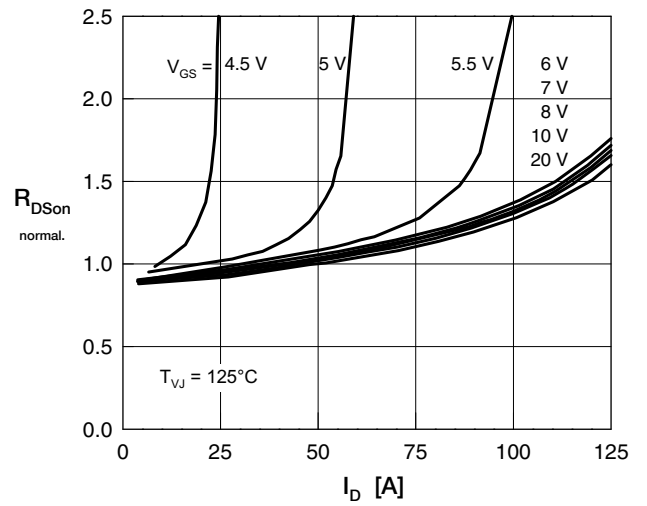


Fig. 4 Drain source on-state resistance  $R_{DS(on)}$  versus  $I_D$

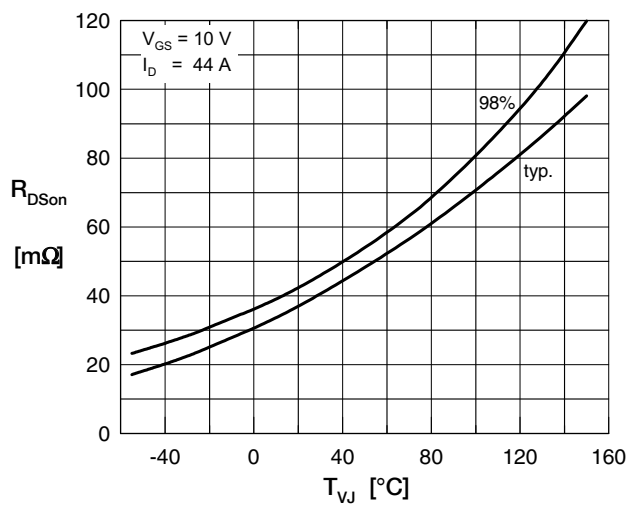


Fig.5 Drain source on-state resistance  $R_{DS(on)}$  vs. junction temperature  $T_{VJ}$

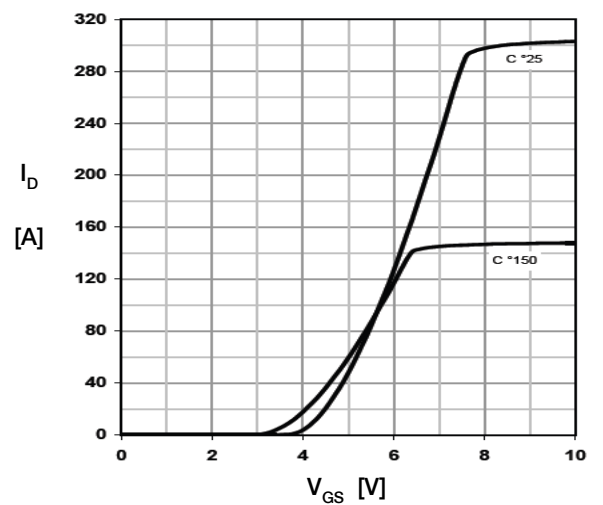


Fig.6 Typ. transfer characteristics

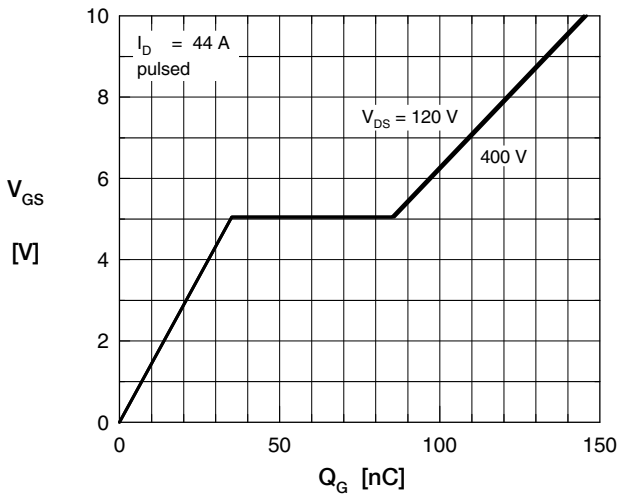


Fig. 7 Typ. turn-on gate charge

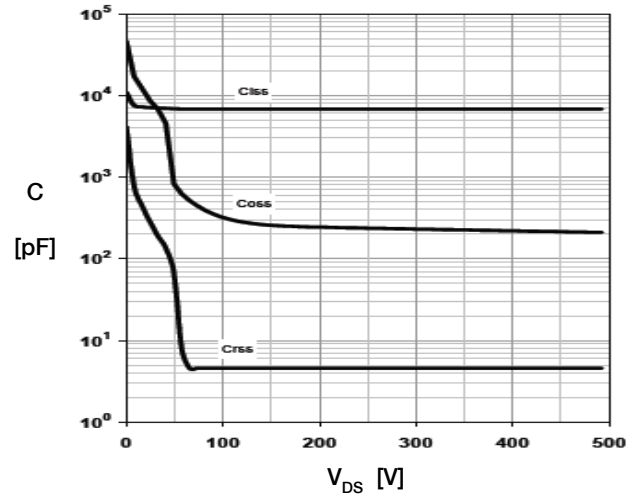


Fig. 8 Typ. capacities, MOSFET only

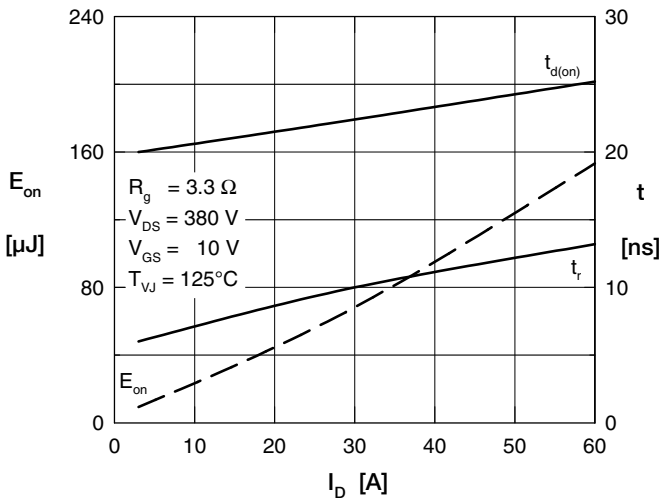


Fig.9 Typ. turn-on energy and switching times versus collector current, resistive switching

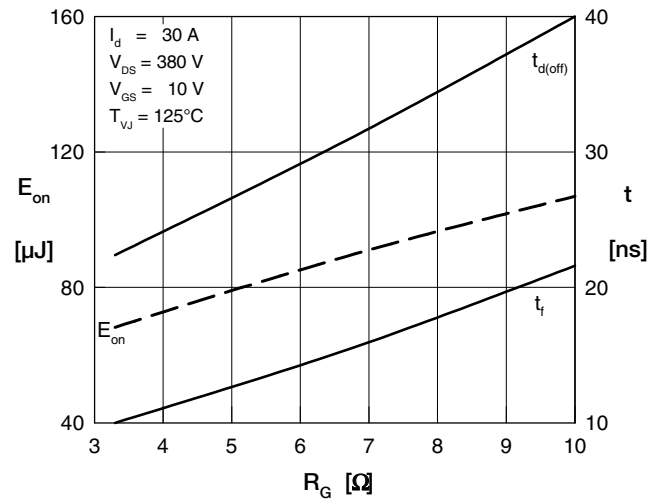


Fig. 10 Typ. turn-on energy and switching times versus gate resistor, resistive switching

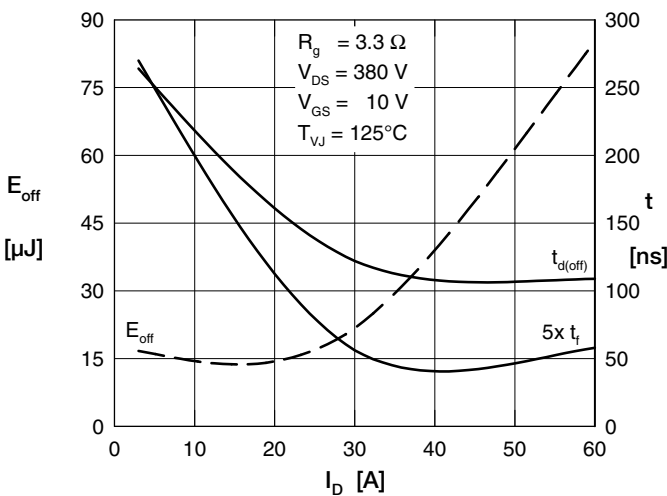


Fig.11 Typ. turn-off energy and switching times vs. collector current, resistive switching

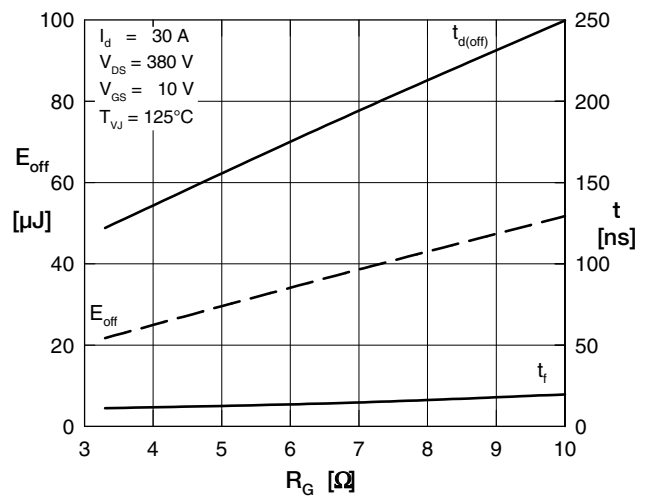


Fig. 12 Typ. turn-off energy and switching times versus gate resistor, resistive switching

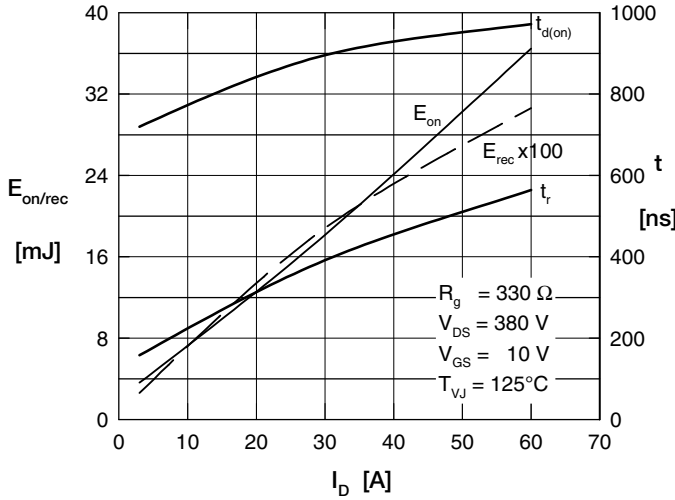


Fig. 13 Typ. turn-on energy & switching times versus collector current, inductive switching (phaseleg)

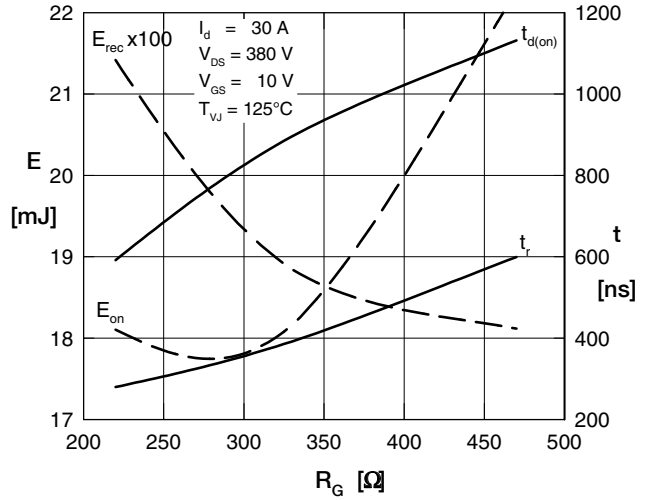


Fig. 14 Typ. turn-on energy & switching times versus gate resistor, inductive switching (phaseleg)

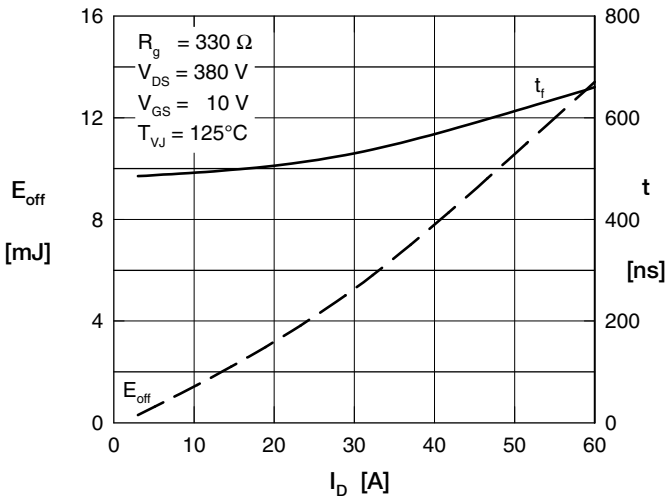


Fig. 15 Typ. turn-off energy & switching times versus collector-current, inductive switching (phaseleg)

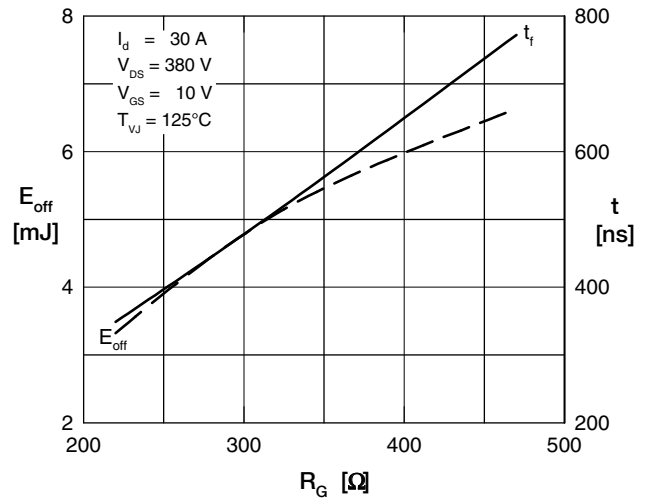


Fig. 16 Typ. turn-off energy & switching times versus gate resistor, inductive switching (phaseleg)

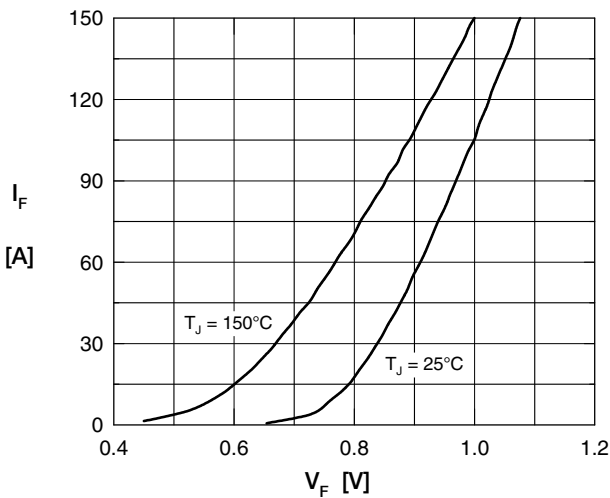


Fig. 17 Typ. forward characteristics of source drain diode  $D_{SD}$

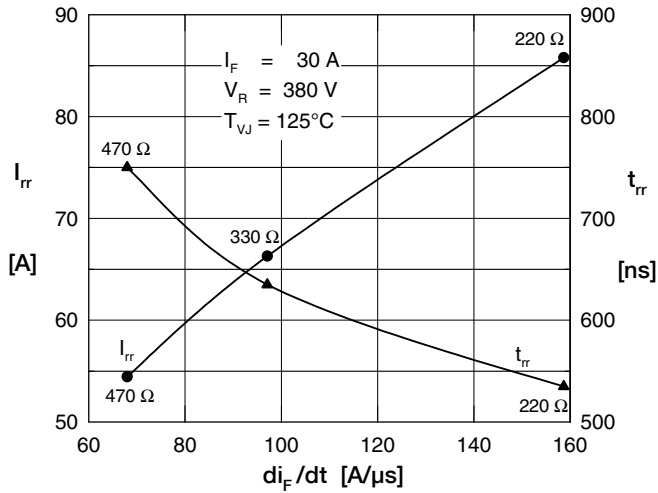


Fig. 18 Typ. reverse recovery of anti-parallel diode

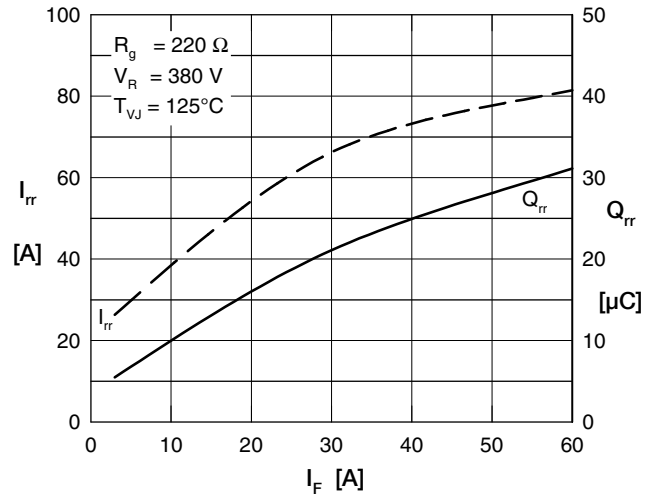


Fig. 19 Typ. reverse recovery characteristics

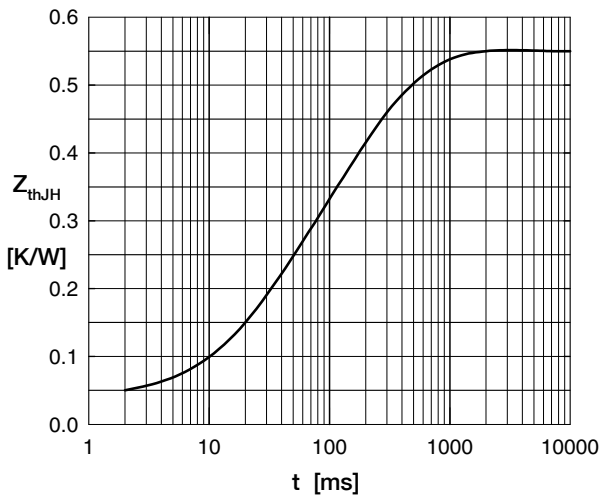


Fig. 20 Typ. transient thermal impedance of the MOSFET (IXYS test setup)